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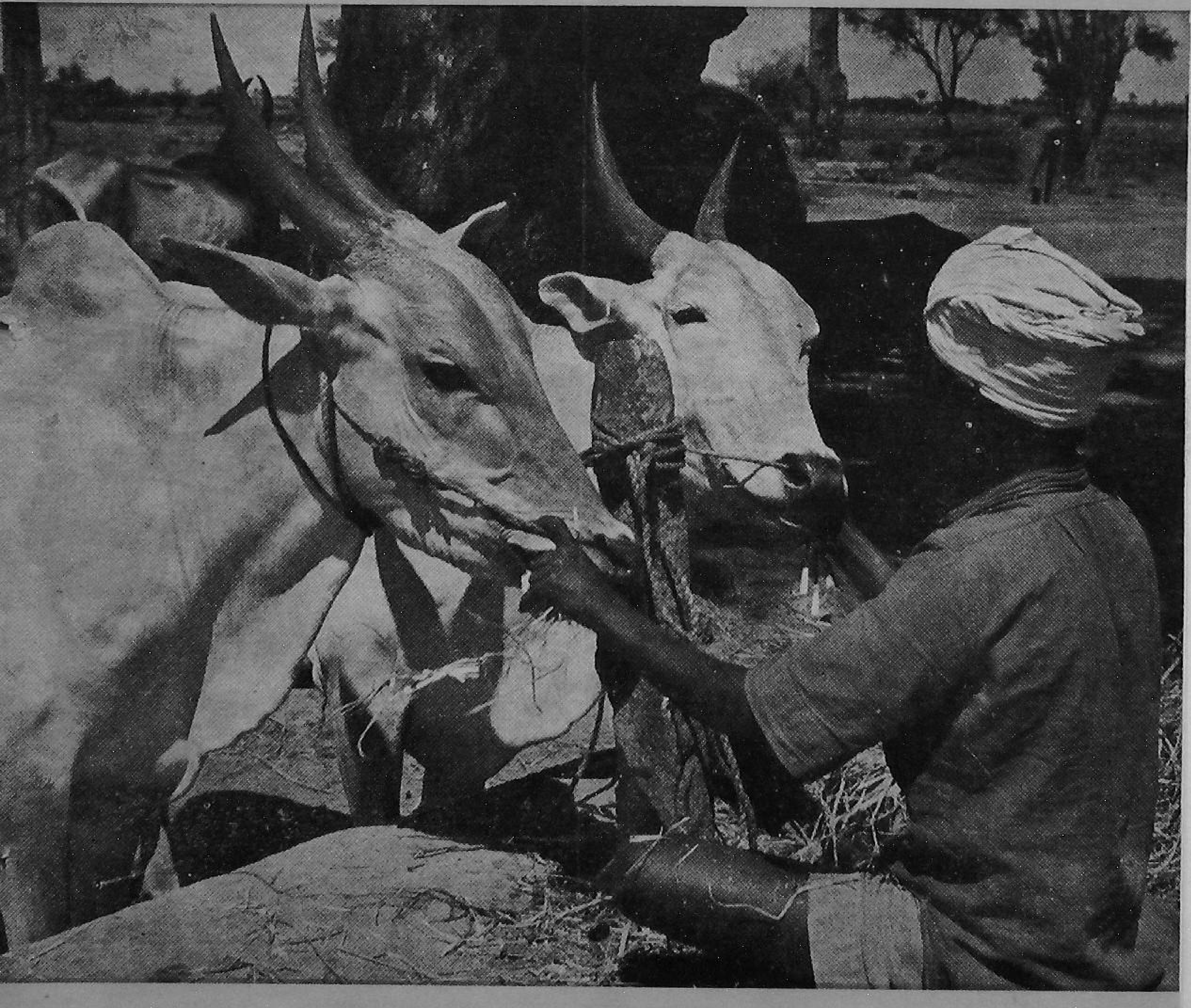

IN THIS ISSUE

Dr. Zakir Hussain

Vice-President of India

in the Gosamvardhana Week

broadcast message urged :

"We love and revere cattle—we should know to translate this sentiment into national achievement. . . . ."

WE have in India cattle which constitute about a quarter of the world's total bovine population, but it is a pity that the production of milk and milk products is almost the lowest. We love and revere our cattle, but we may not stop at mere sentiment. We should know to translate this sentiment into national achievement. We should develop the milk-yielding capacity of well-defined milk breeds by selective breeding and upgrading of non-descript cattle. We should improve the draught breeds In milk yield without impairing the quality of bullocks. We have to provide for the development of good and ample feeds and fodder.

The Gosamvardhana Week should serve to remind us of the important role of the cow in our national economy and spur us on to take effective steps for the preservation and improvement of our cattle wealth. In the critical time through which we are passing, fighting at the battle front and production throughout the country are aspects of the same national effort—the effort to live only in freedom. On each one of us is imposed the duty of the best possible in the task he has in hand. These are testing times; I am confident we will not be found wanting.

I wish the work in the Gosamvardhana Week all success.

Reproduced above is the text of the Radio message of Dr. Zakir Hussain, covered in the Radio news-reel of the AIR.

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OUR COVER: **Kindliness pays**

Editorial

• National Emergency and Gosamvardhana

RECENTLY our Prime Minister, Sri Jawaharlal Nehru voiced the feelings of the people that the country was faced with a grave situation that had arisen on our frontiers because of unabashed aggression by the Chinese forces. The country has stood up and is awakened to face it. The enthusiasm of the people to contribute to the national cause has emerged in tremendous magnitude. It is up to us to channalise this enthusiasm by transforming it into active peoples' participation in various schemes launched and being revitalised for increasing the production in the various fields. Our developmental programmes have also to be conditioned and adapted in the light of specific circumstances now prevailing.

Animal Husbandry and Dairying programmes, accordingly are to be reorganised and reviewed in these changed circumstances. The schemes which can be implemented without resorting to foreign exchange and without adversely affecting the other resources primarily required for the defence of the country, should be devised and planned out.

We have about one thousand good voluntary public institutions of Goshalas working in the field of cattle keeping. On a rough estimate these institutions can handle ten thousand mds. of milk per day. For meeting the requirements of milk and milk products, these institutions can be immediately taken up for intensive milk and milk production work. By turning these institutions into really milk collection-cum-producing and distribution Centres, these institutions can supply milk and milk products to the local and adjoining areas thus ultimately working as a regulating factor to control the milk prices. In this sphere, the peoples' enthusiasm can be best made use of.

Efforts are already afoot all over the country through large scale projects of dairyiny, key-village scheme, fodder development and other projects etc to augment the milk production and its processing in different tracts of the country. Still there are a number of tracts where large scale work may not be practical and feasible because of several limitations. In such areas, small creameries may be started. The cream can further be converted into butter and ghee. This would provide work to hundreds of people and also help for keeping the prices of ghee and other products to a normal level.

Our agriculture in the post-independence period has been drifting towards mechanisation. A number of resourceful and mechanically equipped farmers are already using tractors and other mechanical implements for various agricultural operations. Would it not be worthwhile to give a re-thinking to this aspect? The fuel and other capital resources required for running and maintenance of tractors may be needed more for our defence purposes in due course of time. It has been experienced that the quality of the bullocks can be sufficiently improved by better feeding and management. The efforts for improving the quality and for increasing the number of good bullocks is obvious in the present circumstances. The bullock carts with necessary improvisations can be utilised for agricultural transportation of goods.

Our experience in the last war has shown, and it may be imperative to some extent, that the petroleum and other bye-products also have to be diverted to meet the defence needs. It is suggested that we may explore the possibilities of making cow-dung gas in our villages. It would help in meeting the requirements of demestic fuel, lighting and also motive power required for our small scale rural industries.

Dr. S. Radhakrishnan's

BROADCAST MESSAGE TO THE NATION

On the eve of the Gosamvardhana Week Celebrations (28th Oct. '62) the President of India, Dr. S. Radhakrishnan gave a radio broadcast to the Nation. Reproduced below is the text of the said broadcast.

I am happy to address you today on the occasion of the Gosamvardhana Week, which will be observed throughout the country from tomorrow, the 29th of October, under the auspices of the Central Council of Gosamvardhana, the State Departments of Animal Husbandry, and various non-official organisations interested in cattle protection and development. The theme of the celebrations is 'Quality—the base of Prosperity'.

The annual festivals of Govardhana and Gopashtami have been observed by our people for many centuries. These festivals demonstrate the great importance we attach to cattle in the daily life of our people. In spite of technological advances, cattle in our country continue to be the major source of supply of the motive power required for agricultural operations and rural transport. They also supply milk for the nutritional needs of our people.

The importance of the cow and her progeny is brought out in many ways in our ancient scriptures. The devotion of Krishna to the cow, the association of Nandi with Shiva and of the Kamadhenu, the giver of all, with Indra, not only signify the close association of cattle with the welfare of our people but also enjoin on us a duty to protect our cattle wealth, particularly during natural calamities like famines and floods.

There is a great deal of sentiment for the cow; but in our daily life the welfare of the cow has been sadly neglected. There is a tendency among our people to maintain large number of cattle and take pride in them but adequate attention is not paid by them to see to it that the cattle are properly fed and cared for. The result has been that the average productivity of the cow has remained low. In the changing economy of the country, there is increasing need for more productive cattle both for milk and draught.

Aware of the importance of cattle in the economy of the country, the Planning Commission and the Government, both at the Centre and in the States, have shown great anxiety for the development of cattle and dairying ; and programmes in the Third Five Year Plan in these spheres have been greatly expanded.

Our Government is a people's Government and it is constantly striving to enlist the active participation of the people in all its programmes.

It is, therefore, a happy sign that the Central Council of Gosamvardhana which has been entrusted with the responsibility of the development of cattle in the country, has brought within its fold officials, non-officials and scientific experts to work as a team with one goal in view. Similar organisations in the form of State Councils of Gosamvardhana are being set up in various states.

There is a large scope for non-official organisations supplementing the efforts made by the governmental agencies for cattle and dairy development in the country. Special mention may be made of the traditional institutions of Gaushalas and Pinjrapoles spread all over the country which I think, have to play an increasingly important role in the field of protection and development of cattle. Gaushalas and Pinjrapoles, as voluntary public bodies, have the advantage of being in direct contact with the people. With the advancement of science and the spread of education in the country, our people are becoming increasingly conscious of the need to apply improved methods in all fields of development. The Gaushalas, which are re-orienting their outlook on scientific lines, can carry the message of scientific development of cattle to the general public. Schemes for the development and reorganisation of Gaushalas and Pinjrapoles as cattle breeding cum milk production centres have been included in the Third Five Year Plan and it is noteworthy that these institutions are availing themselves increasingly of the assistance provided under various schemes.

The representative institutions of Zilla Parishads and Gram Panchayats have necessarily to play an important role in the development of village economy. I am hopeful that these Parishads and Panchayats would devote their attention to the problems of cattle development as well as the agricultural and rural prosperity.

The Gosamvardhana Week is now being celebrated under the joint auspices of the Central Council of Gosamvardhana, State Departments of Animal Husbandry and various non-official organisations interested in the welfare and development of cattle with an emphasis on the economic development of the cow and its progeny. This clearly indicates the new urge among our people to improve the productivity of their cattle. This will necessarily entail hard and persevering work over a number of years. I take this opportunity of appealing to our countrymen to devote adequate attention to the problems of proper breeding, feeding and management of their cattle and thus make the Gosamvardhana celebrations purposeful.

• OTHER SPEECHES AND BROADCASTS APPEAR ON THE FOLLOWING PAGES

"IT IS TO BRING ABOUT A BETTER UNDERSTANDING OF THE PROBLEMS OF CATTLE IN OUR COUNTRY AND THE MEASURES TO BE ADOPTED FOR THEIR DEVELOPMENT THAT THE GOSAMVARDHANA WEEK IS ORGANISED.."

S.K. PATIL on Cattle Development

I am glad to say a few words about Gosamvardhana on the occasion of the Gosamvardhana celebrations being held in the country for a week from Govardhana to Gopastami. These two festivals symbolise the importance of cattle wealth in our country, from the very early period of Indian civilisation. With the passage of time, these national festivals have taken the form of rituals for the worship of the cow. They have thus helped to keep alive the feelings of respect and veneration for cattle, which are necessary for the development of our economy. However, mere sentiment is not enough ; it has to express itself in positive action for the improvement of our cattle wealth. The Gosamvardhana celebrations thus provide an opportunity to remember and to remind our countrymen about the extremely important role played by the cow and its progeny in our national economy. But we should not stop there. We have to dedicate ourselves afresh to the real welfare of the cow. We have to take better care of them so that they can serve us better. We have to feed them and manage them in a better manner so as to increase their contribution to the national welfare and national income. It was to bring about a better understanding of the problems of cattle in our country and the measures to be adopted for their development that the Central Council of Gosamvardhana has been organising a "Gosamvardhana Week" all over the country. This has been possible through the active cooperation of the state governments, union territories and various non-official organisations.

Agriculture, as every one is now fully aware, constitutes the main basis and foundation of our economy. All our programmes of economic development depend ultimately upon the measure of success which we are able to achieve in our schemes for increased agricultural production. Agricultural development in its turn depends upon the development of our cattle wealth. Cattle are a valuable source of supplementary income to the farmer and his family. Bullocks provide draught and motive power for agriculture and other operations all over the country. There has been a trend for

increasing mechanisation of agriculture in some parts of the country and the use of mechanical transport, but I am of the view that for many years to come we shall continue to depend mainly on bullock power for our agricultural operations in view of the small land holdings of our farmers and the shortage of capital for large scale mechanisation of farming. The need for increasing the production of milk and milk products for the vast population is also equally important. Increase in the production of milk or the draught capacity of our cattle cannot, however, be brought about unless we develop our cattle on scientific lines. This is an enormous task. The fact that the development of cattle is necessarily a long term process, accentuates the problem.

Numerically we have the largest number of cattle in our country, constituting nearly 1/5th of the world cattle population. According to the Livestock Census 1961, our cattle population now stands at 17.57 crore against 15.87 crore in 1956. In addition, our land has to support 5.1 crore buffaloes, and about 11.0 crore other animals excluding poultry. Unfortunately, the vast majority of our cattle are of non-descript character with a very low level of production. According to an estimate made in 1956, the average annual milk yield of cows in India was estimated at 382 lbs. only against 2,000—3,000 lbs. per lactation for some of the recognised Indian breeds of cattle. This points to the need not only for upgrading the vast number of non-descript animals but also for developing the recognised breeds. The Central Council of Gosamvardhana has, therefore, very aptly given the theme of this year's celebrations as "quality—the base of prosperity."

I am glad to say that there has been an ever-increasing consciousness both at Government level and among the people about the need for improving the quality of our cattle through better feeding, breeding and management. This is reflected by the financial provisions for Animal Husbandry in our Five Year Plans. From Rs. 8 crores in the First Five Year Plan it was raised to Rs. 21 crores in the Second Plan. In the Third Five Year Plan, a provision of Rs. 56 crores has been made for Animal Husbandry schemes while another Rs. 34 crores have been provided for Dairy Development schemes.

Improved breeding is the first essential requirement of cattle development programmes. We have, therefore, adopted a breeding policy which aims at the development of dual purpose breeds of cattle which will be useful both as milch animals and for draught power. To bring about an improvement in breeding, feeding and management of cattle, a net-work of about 400 key village centres has already been established all over the country and these are being intensified and improved under the Third Five Year Plan. Selected bull calves produced at these centres are subsidised till they attain maturity. The other important schemes taken in hand are the development of gaushalas which are serving as breeding-cum-milk production centres, the progeny testing of bulls and mixed farming. We have also been trying to make the best use of the superior young stock available at the milk colonies for breeding purposes in selected pockets of cattle development. The State Governments on their part have also been expanding and reorganising the state cattle breeding farms and have been implementing various other schemes for development of the cattle. Farmers and cattle owners, cattle welfare institutions like gaushalas, pinjrapoles, cattle breeders' cooperative societies etc. have also been contributing their share. I must, however, say that schemes for the upgrading and better feeding and management of our

stock cannot succeed unless we also take measures for restricting the multiplication of non-descript cattle. The pressure on grazing land is already so very great that we cannot afford to multiply inferior and non-descript cattle indiscriminately. As a step in this direction, a comprehensive scheme for mass castration of scrub bulls has been included in the Third Five Year Plan. I trust that the state governments who are responsible for implementing the scheme will accord it high priority and make all-out efforts to implement it in as short a time as possible.

In a democratic country like ours, the successful implementation of any scheme for development depends upon the extent to which the active support and participation of the people can be obtained.

I would, therefore, like to conclude with an appeal to farmers, cattle owners, the large number of voluntary organisations working for cattle welfare to come forward and supplement Government efforts in the direction of cattle improvement. They are already playing an important role in the preservation and improvement of our cattle wealth, specially the cows. However, the need for continued and increasingly vigorous effort remains. I would, therefore, request the people to devote more attention to their cattle, to improve their quality by availing themselves of the facilities and assistance being provided under various cattle and dairy development schemes and to make these institutions real demonstration centres in their respective areas.

WAIT FOR THE NEXT ISSUE

of

GOSAMVARDHANA

for

COVERAGE OF GOSAMVARDHANA WEEK CELEBRATIONS 1962

IN SOME OF THE STATES

"India cannot subsist without the cow— she is the base of Indian agriculture"

U. N. Dhebar

SPEAKS FROM THE AIR

[Following is the English rendering of a Hindi talk, by the President of the Central Council of Gosamvardhana, broadcast during Gosamvardhana Week.]

I doubt very much if our *Rishis* and forefathers would have imagined that a day would come when their successors would require to be told, retold and told again and again about the usefulness of the cow. But unluckily that is what is happening. Very few people realise that India cannot subsist without the cow. It may appear that I am making a tall claim. I am not arguing on sentiment or for winning orthodox votes. I am arguing for the realisation of the reality and earlier the realisation dawns the better. The fact of the matter is that the cow is the base of Indian agriculture.

It may be argued that if Japan can do without cow, other countries can do without her, why cannot India do without her ! It is true that Japan cultivates with hand and that cultivation in the West was formerly horse-based and is now tractor-based.

A horse-based or buffalo based or tractor-based agriculture or hand ploughed is unthinkable in India. Again and again I must repeat that it is only the cow-based agriculture that is going to be suitable to our economy not only today, but tomorrow and let me add for a period of hundred years. Tractorisation can be possible only if we are in a position to purchase or manufacture 40 lacs of them and have 4 lacs more every year for replacement. This is an obvious impossibility having regard to our resources. Horse based or buffalo based agriculture will be thoroughly uneconomic. Horse will give horse but not food. The fodder convertibility in horse is nil from the point of view of our food needs. Male calf of a buffalo is useless for summer cultivation in the dry faming areas. The hand-based cultivation as in Japan can be lucrative only if the holdings are small and there are perennial sources of water supply. Small pieces of irrigated land can only be put to such cultivation.

Cow is a multi-purpose animal. It gives work, milk, traction power, manure and carcass. No other animal can fulfil all these functions simultaneously. Herein lies the proof of wisdom of our forefathers and the *Rishis*. Take away the cow and we take away the employment of lakhs of breeders, take away the cow and we take away the possibility of providing milk and animal protein to our

people; taking away cow would mean we write off our agriculture.

The difficulty in India is that we have a knack of complicating a simple problem. We can mix up so admirably the sentiment and prejudice that an outsider gets puzzled. That is what is happening in this case. The prejudice against old approaches prods the educated into thinking that the Indian cow can never be economic and basing their arguments on this complaint they are out to write off the cow permanently. Those who believe otherwise feel that this westernised people are out to destroy the basis of Indian culture which the meek and mild cow symbolises. Thus the cow today is wedged between the prejudice and the sentiment.

I would directly admit that the cow is not economic today. But I would contest with all the strength at my command that the cow cannot be uneconomic. The reasons for her being uneconomic are not in the cow but in the colossal neglect from which she is suffering at the hands of the state and the people. Good husbandry and proper diet can change the whole picture. Both the reasons are external.

My appeal to those who think of the cow on so called modern lines, is to study the place of agriculture in the economy of the country and the place of the cow in relation to agriculture. They will realise as some of us have realised that therein lies the key to the essential problems of rural sector. They should accept the reality of the situation and assist the Council to fight the empty prejudice of others.

Similarly I would appeal to those who approach the problem from a sentimental angle to think of the cow without the milk. It is a hard reality that Indian cow has since long ceased to be a Kam Dhenu that she was. She is a mere factory for converting the waste and garbage in the urban areas and the crumbs left by bullocks and the buffaloes in the rural areas into manure.

Gosamvardhana Week is intended to enlighten the former about the indispensability of the cow even in the existing condition and the latter about the need to look after her and see that the cow discharge all the five functions she is intended to do. I would appeal to the educated to study the problem more objectively and the sentimentally-governed to serve the cow in a way whereby the cow really becomes a Kamdhenu.

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Rehabilitation of URBAN CATTLE

By
DR D. JAYARAMAN

NOW there is rapid industrialisation of the country which is leading to Increasing urbanisation. As a result, all old cities are growing and new ones are coming up. In the absence of an organised dairy industry based on rural milk production, our cities by and large depend upon the city milk producers. These urban areas offer the best market for milk even though there is high cost of feed, fodder, housing, labour, animal cost, and cost of production. The breeders too are not able to resist to part with their best animals from the breeding tracts when tempting prices are offered. This has resulted in large scale concentration of milch animals in over crowded cities. As there is no remunerative outlet for milk producers in rural areas, the farmers have, by and large, taken to the growing of food and cash crops. They keep one or more cows primarily to raise bullocks rather than to producé milk. In many respects the present conditions of milk production in India are similar to those existing around the large cities of the United States in the past. Even there, the cow was taken as close to the city as possible, milked for one or two lactations and then sold for slaughter.

Advantages of keeping cattle in urban areas : (1) If all precautions are taken, highest grade of raw milk can be produced under exceptionally careful conditions, and the milk can be delivered in raw condition to the consumers without pasteurisation and without impairing the nutritive properties of milk. It is done in few countries under Medical Milk Commission and State Board of Health. But this is very rare and it is very difficult to undertake especially in tropical countries like ours. (2) Less cost in handling and (3) Rapid delivery.

Disadvantages : The first and the foremost is the large scale concentration of milch animals in over crowded cities. This has resulted in lodging the animals in unhealthy, uns anitary, congested and unnatural surroundings. The animals are allowed to spend 240-300 odd days of lactation in the slurry of urine and dung. Fresh cream of stock are being drained

from the breeding tracts to replace the dry animals in these centres. These best animals when they get into the urban areas, are fed well as long as they are in milk, but once they go dry, they become a liability on the milkmen. Most of these animals will have premature death, resulting in shortage of milch animals, less production, high milk price and the perpetual adulteration.

Rearing of calves : Since the professional men in urban areas are only casual producers of milk, rearing of calves does not find a place in their general management. Calf rearing is a career. Training is desirable but not essential. Professional men need not have deep knowledge of feeding, but he must know how to feed and what to feed. The keen demand for milk leads to neglect of young calves. Unlike other advanced countries, Dairymen in our country want to have the entire progeny, even though they are allowed to lick the mud and live. This is really an object of pity and a poem of mercy.

Dry stock : As soon as the milch animals become dry they become a liability. Some are sent to breeding tracts for salvaging under private management, some are sold in exchange of an animal to a dealer at a considerably low price, some are sold for slaughter and most of them will have premature death. Maintenance of dry cattle depends largely on the fertility of the soil, reliable rain fall and availability of grazing land.

Rehabilitation of Milch Animals : Now the policy of the Government of India is to clear all the cities of milch animals and avoid concentration in new cities. No doubt it will be a boon, but will it be possible to cater to the needs ? Approximately 40 lakhs of high grade buffaloes and cows with a production of about 5 lakh mds. of milk daily are kept and reared in urban areas. These represent the best available specimens of milking cattle. Assuming that 40 lakh milch cattle will have to be removed, about 80,000 acres are required only for stationing cattle and their owners. Coming to grazing area about 200 lakhs acres are required at the rate of atleast 5 acres per animal in a tropical country like ours. As it is in India there are no grazing lands left worth mentioning. As such it is out of question to think of the grazing lands for 40 lakhs of cattle leaving alone the entire population of 248.15 million cattle as per 1961 census. As regards shelter for the animals and the milkmen, the expenditure is approximately worked to Rs. 2,100/- per animal including repairs. This will cost crores which is beyond the scope of the plan. Special housing and special labour for this purpose will only create problems. Moreover, the huge capital investment would also reflect in the cost of milk produced. As such it would only be a wishful thinking than a practical suggestion.

Few places like Bombay, Calcutta and Madras have undertaken to construct cattle colonies involving very high cost and provided shelter for very few animals. It is certainly quick and spectacular in results, but involves large maintenance expenses. The cattle owners who have shifted from the city stables are only commercial adventurers and not dairy farmers. The cattle also do not have the advantage of being kept in their natural surroundings and breeding tracts. Even such schemes demand for fresh milch stock to the extent of 10% animals every month, creating new problems such as procurement of fodder and concentrates in rural areas, transport facilities, disposal of manure, salvaging of dry

animals, calf rearing, and dearth of economic cattle in the breeding zones.

Recommendations :

(1) Tap milk from rural areas where animals live in natural surroundings where the cost of milk is bound to be low. If this is encouraged, the city milkmen can be gradually eliminated on economical grounds.

(2) At the initial stages, as cost of rural milk may not appreciably be cheap due to high cost of collection and transport. It is worthwile granting subsidies to encourage rural milk producers. This should be carried out in a planned and effective manner, without political prejudices, professional pride and public scandal.

(3) Giving all possible assistance in rural areas towards increasing the production of milk.

(4) Discouraging the keeping of animals in urban areas by strict licencing system and preventing fresh animals coming into the city.

(5) Registration of animals especially in breeding areas on payment of subsidy for rearing high producing animals.

(6) Rehabilitating the urban cattle in suitable areas outside the city and providing essential services such as roads, drainage, water supply and electricity. Allowing the producers to errect their own sheds according to the approved design.

Remarks : Rehabilitation of urban cattle depends on the willing settlers with agricultural bias having enough grazing facilities and cultivable lands where there is ample and reliable rain fall, having permanent supply of good water or irrigation for all purposes. All progressive countries of the world have not allowed their milch animals to be kept in their cities. They realised the consequences and entrusted milk production to the rural producers. There the animals are fed more economically on farm produced feeds and forage. This in turn resulted in evolving the type of milch animal which are economical for milk production. Every country that has developed dairying industry, received subsidies from their respective Governments, at some stage or other.

The aim should be to avoid concentration of milch animals in the new townships and have milk schemes for each of these townships right from the start. If early effective steps are not taken to arrest the inflow of best breeding animals to the urban areas and to eliminate unserviceable and unproductive cattle production to keep balance between population and the availability of feed and fodder, the huge amount spent on cattle development schemes would not bring about any change. It has been estimated that only 30% of the concentrates and 70% of required roughages are actually available for feeding the existing cattle in our country. It is also learnt that 40 to 60% of the animals are actually starved to death due to uncertain weather conditions and crop failures. To implement rehabilitation several problems have to be solved. There is no single solution to the problems. The problems of milk production and marketing are chiefly economic propositions and so attention must be directed to improve the economic condition of the rural milk producers and improvement in the condition and performance of rural cattle for real progress.

A NOTE ON THE

TRAINING IN GRASSLAND AND FODDER DEVELOPMENT

THE initiation of Feeds and Fodder Development Scheme sponsored by the Govt. of India during the second plan has been a land mark in the history of animal nutrition in India. Although the State Forest and Agriculture Departments are concerned with it, its active operation in the states has been chiefly linked with the Key Village Scheme of the Animal Husbandry Departments. The main emphasis has been placed on the popularisation of improved fodder and forage crops and distribution of their seed or planting material, establishment of pasture demonstration plots, conservation of fodders and better methods of utilization of the existing fodder resources. The approach is essentially of an extension type i.e. the application of results of research in the field with the active collaboration of the farmers. The success of any extension scheme depends to a considerable extent on the knowledge possessed by the field workers about the subject matter. The subject of fodder and forage crops is a specialised one and has only recently received active attention of the research workers. As such the feeds and fodder development scheme can achieve the desired success only when the Key Village Offieers, trained in entirely a different discipline, keep in touch with research organisations dealing with the subject of forage crops.

The fodder development programme in Rajasthan, owing to peculiarities of climatic conditions, hinges, to a large extent, on the optimum development, proper management and judicious utilization of the native grasslands. The results of research on grasses, grasslands and other forage crops, of practical value, obtained at the Central Arid Zone Research Institute, Jodhpur, were viewed with great enthusiasm by the State Animal Husbandry Department as an excellent source of training for the Key Village Officers of the State. A short term training course was organised by the Institute from 17th to 31st August, 1962 in which 26 Officer trainees participated.

In drawing up of the training programme the practical aspect was kept in view with such theoretical knowledge as would be useful in the demonstration of the useful practices. The subject matter concerned during the training period was as under :

(1) A review of research on grasslands and and range management in various countries of the world.

(2) Forage and fodder crops of Rajasthan and their cultivation.

(3) Production of seed planting material of forage and fodder crops.

(4) Conservation of fodder crops.

(5) Fodder crops in relation to soil fertility and mixed farming.

(6) Important grasses and legumes of Rajasthan and their identification.

(7) Types of grassland covers of Rajasthan, their improvement and management.

(8) Cultivated pastures.

(9) Soil and Water Conservation on range lands.

(10) Fodder trees and shrubs and their utilization.

(11) Animal production in relation to range management.

The importance of research in improvement of grasslands, and evolving suitable range management practices served an introduction to this course. The researches conducted in Australia, Newzealand, U.K., U.S.A. and mediterranean countries were reviewed. The principles of rangement evolved in the U.S.A. were detailed in the opening lecture to the trainees.

Eleven choice of the cultivated fodder crops and their varieties suiting to the soil and climatic conditions of the tract under considertion has an important bearing in the extension programme. A comparative knowledge of the performance of different fodder crops enables an extension worker in selecting the proper, high yielding palatable nutritious fodder crops. A full information on the fodder crops, old and new including the cultivated fodder grasses suitable for Rajasthan was given to the trainees. An important step in the popularisation of the suitable fodder crops is the production and distribution of the seed or planting material. Seed production of fodder crops especially the the legumes requires special consideration and their aspect was specially emphasised in the training course.

Supply of succulent fodder through the year is vital in keeping up the animal production—more especially where cattle are kept for milk purpose. The supply generally becomes scarce during autumn and summer months and hence the conservation of fodder especially in the form of silage becomes important. Silage serves as equivalent of green fodder during the scarcity periods. Understanding of the principles and practice of silage and hay making are, therefore, necessary for the extension workers for demonstration purposes. This aspect was specially kept in view while imparting training to the Key Village Officers.

As a rule farmers prefer to grow food and cash crops on their holding and the idea of cultivating fodder crops does not readily find favour with them. The improvement of soil fertility by growing leguminous fodder crops, rotating these systematically all over the holding thus raising the crop production considerably gives the added benefit through the sale of animal products in practice of mixed farming, are some new ideas which can induce the farmers to grow fodder crops. To gain confidence of the cultivators the extension workers must possess a good background of

the philosophy of mixed farming and therefore, this subject received a prominent place in the training programme.

As has already been indicated, the livestock industry in Rajasthan depends to a large extent on the native grasslands. These natural resources are required to be used very judiciously, much more so in the arid regions of Rajasthan. Improper use of the grasslands in the past has created very complicated problems effecting the livestock industry and therefore a through knowledge of the types of grasslands and principles of their improvement and management is essential in demonstrating that over-grazed grasslands can be improved and that more healthy animals can be maintained on these.

The grasslands in the arid regions require all the water conservation measures for the maintenance of the vigour of the grass plants. All these aspects were covered in the training programme under items 5 & 8.

Grasslands in the monsoon belt are characterised by a flush period during the monsoon season. The growth of plants stops during the autumn months and the plants begin to dry up. In the utilization of grasslands, therefore, there is a period when the livestock are kept on nutritious forage while there is a prolonged period when the grazing animal has to satisfy itself with less nutritious, dry forage. The grass-lands in Rajasthan, are however, well provided with fodder trees and shrubs such as *Prosopis spicigera* and *Zizyphus numularia*, which with their nutritious leaf fodder help to supplement the nutrition. This important aspect of top feed from natural resources was given its due place in the training. Finally, the influence of rational range management and adequate fodder and feed supply on animal production was discussed to round up the training course.

This comprehensive training programme in the principles of feeds and fodder production and utilization was supported by adequate number of field trips to the various centres under the Institute where the research and development work is actively in progress.

An important outcome of this training programme was not only the officer trainees received the latest knowledge in the various fields of the subject of feeds and fodder production, but the officers imparting the training also gained much knowledge regarding the actual problems of the field felt by these extension workers so that this training programme served two fold functions which, in the present stage of development of our country, will go a long way in achieving the common objectives of the research and extension workers. (P.C.R.)

B. C. P. W.

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BENGAL CHEMICAL

CALCUTTA — BOMBAY — KANPUR

● U. P.

THE Gosamvardhana Week was celebrated in the State of U.P. with great zeal and enthusiasm from October 29 to November 5, 1962.

The Week was inaugurated by holding a special cattle show at Giri-Govardhana in Mathura district on the 29th October, 1962 the Goverdhana-day. Another special cattle show was organised at the U.P. College of Veterinary Science and Animal Husbandry, Mathura, besides 228 One day Cattle Shows organised in various tehsils of the State during the week. 30 selected Goshalas of the State also organised cattle shows in their areas on the Gopashtami day—the 5th November 1962. At these shows various activities pertaining to animal husbandry were demonstrated. They were characterised by meetings and valuable discourses on various problems of the breeders. This opportunity was very well availed of by important high dignitaries particularly the Ministers and Deputy Ministers and some of them attended the shows. In their addresses to the breeders they emphasized the necessity of adopting various improved methods for increasing the productivity of the animals.

During this Week seven important dailies of the State brought out special supplements called the Gopashtami Supplement.

Apart from this, the A.H. Department in collaboration with the Agriculture Department of the State arranged to bring out a special ank of Krishi and Pashu Palan Patrika called the "Gosamvardhana Ank".

The Governor of the State also gave a broadcast on this occasion.

●

GOSA

The country celebrated Gosamvar
accounts of the celebratons at

Broadcast talk by Sri Biswanath Das, Governor of Uttar Pradesh delivered during the Gosamvardhana Week.

I feel extremely happy to speak to you on the important occasion of the Gopashtami Week, although it is very unfortunate that the solemnity of the occasion has been marred by the treacherous and naked act of aggression of a neighbouring country to whom we had always extended, under the inspiring leadership of our beloved Prime Minister, the hand of friendship, tolerance and peace. Behind a facade of co-existence and Panchasheel, they have stabbed us in the back. I have no doubt that they will be driven back in the not too distant time.

The Gopashtami festival, which we have been celebrating for the last several years, is a very ancient and important festival of this country. This festival aims at reminding the people of the important place which the cow and her progeny occupy in our life and economy. The cow is held in veneration in this country and is looked upon as a mother. It is a pity, and to that extent we are grossly

VARDHANA WEEK Celebrations

Week from the 29th Oct. to 5th Nov. '62. Given here are the brief places in the country, on the basis of the reports received by us in time.

guilty, that we should maltreat and neglect the cow and her progeny. Our rural economy is largely dependent on this animal. She provides bullocks for agricultural operations, milk as health-giving food for children, manure to fertilize the fields and after her death, she provides good leather for industrial use.

It is, therefore, extremely important that along with the religious veneration for this sacred animal we should also act in a manner benefitting that veneration and cease to neglect or treat her within difference. It should be our constant effort to provide adequate protection and food to this animal and we should strive to improve the quality and breed of the cow.

It is a matter of great regret that the milk yield of the cow in this country should be one of the lowest in the world in spite of the fact that we hold her sacred as a mother. The western countries do not attach any such sanctity to the cow, yet look after her with greater care and feed her better. That is why cows in these countries are healthier and give more milk.

On this sacred occasion of the Gopashtami festival, I would like to emphasise the great need for improving our cattle wealth and for paying greater attention to the breeding and feeding of cattle. One of the reasons for low productivity in our animals is promiscuous breeding from stray and low quality bulls. The State Government have already a net-work of breeding and artificial insemination centres. It is necessary that people should take full advantage of these centres. Along with scientific breeding, proper and balanced nutrition is also important. Since enough land for the cultivation of fodder is not available in this country, we should adopt the cultivation of such improved variety of fodder which will give higher yield and would contain substantial nutrients which would be helpful in improving the health of animals and their productivity. The State Government have already launched schemes for the improvement of the fodder position in the State. People should take full advantage of the assistance and advice given by the State Government in this direction.

I am confident that the Gopashtami festival

will be celebrated with zeal and enthusiasm all over the State and that it will help in developing a consciousness in the people about the importance of cow and her progeny in the economy and life of this country.

● JAMMU AND KASHMIR

ONE day cattle shows were held in the two provinces of the Jammu and Kashmir State at the following places in connection with the celebration of Gosamvardhana week.

Kashmir province	1.	Chadoora
	2.	Pulwama
	3.	Bandipore.
Jammu province	1.	Jammu
	2.	Ramgarh
	3.	Raya.

The best cattle owners were awarded prizes and were made to understand the purpose of the celebrations. Besides this a radio talk was given on the subject from the Radio Kashmir.

The total expenditure incurred on this account amounted to Rs. 1000/- according to the schedule of prizes and other incidental charges.

● BOMBAY

A Gosamvardhana Sammelan was held at Madhavbaug on the 3rd November 1962 under the august presidentship of His Holiness Jagadguru Shrimad Sankaracharya Maharaj of Sarada Peeth. Seth Ramprasad Khandelwal emphasised the scientific and economic importance of cow's milk in the daily diet, and said that as a result of the special efforts made by Shri Dhebarbhai, cow has got a prominent place in the animal husbandry programme for development. In pursuance of this, the Government of Maharashtra have now sanctioned a scheme of putting up a unit of 500 cows at the Aarey Colony mainly with the object of supplying pure cow's milk as such to the public of Bombay at economic prices. In terms of the scheme Shri Gosamvardhan—a Trust has been established with a view to raise money for the purchase of cows and donating them to the Government of Maharashtra for the proposed unit.

His Holiness Shri Sankaracharya Maharaj while pointing out the importance of the Gopashtami week said that cow held a sacrosant character in our country, not merely on account of its physical structure but for her economic performance as Kamdhenu (Giver of all desires). It is therefore the duty of every lover of cow to lift her up by scientific development and re-instate her as real Kamdhenu of the country.

Shri Jayantilal N. Mankar, Shri Maganlal P. Doshi, Shri Manilal T. Shah, Smt. Jasumati Ben and others also spoke emphasising the religious and economic importance of the cow.

● PUNJAB

Mohindergarh

A milk yield competition was conducted in the Gaushala of Mohindergarh.

The cow of Shri Khurda Ram of Mohindergarh stood first and three cows of the Gaushala secured the second, third, and fourth positions.

On the morning of 5th November, 1962, a procession including good cows, calves; pair of bullocks, cow-bulls, started from Gaushala was taken early in the morning.

Speeches stressing upon the development of cattle along with their importance and active role in the economy of the nation were delivered by the various speakers. All the speakers stressed upon the scientific development of cattle wealth.

The children of Primary school were invited and cow milk was distributed among them.

One day cattle show was arranged in which a large number of cattle participated.

Handsome prizes were awarded to the best animals of the show.

A resolution urging the ban of the export of cattle from Mohindergarh District was passed by the Gaushala Managing Committe, Mohindergarh.

Narnaul

A Milk-yield competition was held in the local Gaushala from 3-11-62 to 5-11-62.

Milk was served to the children of A.S.D. School Narnaul and Government Primary School Narnual Mandi on 5-11-62

In the evening a cattle show was held in the local Gaushala where prizes worth Rs. 150/- were awarded to the owners good animals.

PROTECT THE COW AND HER PROGENY

use of modern Anthelmintics against Helminth parasites

by
Shri Munshi Lal

THE importance of worm parasites as disturbing factor in our livestock economy is being increasingly appreciated, and today, with rapid intensification of agriculture and animal husbandry to meet the nutritional needs of our enormous and ever-growing population there is great demand for effective methods of controlling parasitic infestations. The helminths form a large and variegated group of potential pathogens whose economic importance has been judged as second only to that of bacteria. The total economic loss caused by them through interference with growth of animals, their health and productivity has been estimated to run into colossal figures.

The term 'anthelmintic' is contraction of the words 'anti' and 'helminth'. These are drugs which eradicate (kill or expel) internal parasites (worms). Anthelmintics administered by mouth are either not absorbed or absorbed slowly so that they come in for a prolonged contact with the worms and paralyse their muscles, or narcotise them and diminish their vitality, or kill them straight so that they are dislodged from their hold and are expelled alive or dead by the intestinal peristalsis or by the action of the purgative administered alongwith or after the anthelmintic.

Zoologically the helminths have been divided into three large classes, viz Nematoda (round worms), Trematoda (flat and non segmented fluke worms) and Cestoda (flat and segmented tapeworms). In this article anthelmintics used against nematodes only will be discussed. The nematodes are found in the alimentary canal, lungs (metastrongyles), and tissues (filaroids) of the host. Their life cycle involves free living-forms and frequently immature forms which migrate through the host

tissues before reaching maturity in the intestines or lungs. For convenience of description the nematodes in cattle have been further subdivided into (i) Ascarids (large roundworms), (ii) Bursate (strongyloid) worms, and (iii) Filaroid worms.

Ascarids and their Remedies

'Ascaris (Neoascaris) vitulorum' is the common worm of this group infesting the small intestine, especially in the suckling calves. The parasites when present in a large number cause marked digestive disturbances, loss of appetite and diarrhoea. There is progressive loss of condition, animal becomes dull and easily exhausted, its coat becomes dry and harsh. An unusual smell resembling that of fresh ascarids (chloroform or other) may be noticed about the animals. In the case of young stock the growth is arrested and they become pot-bellied. In a pregnant cow the foetus may be affected (prenatal infection). In advanced cases the animal may show convulsions and die of extreme emaciation.

Piperazine Adipate :—at the rate of O.1G per lb body weight injected into the rumen or administered orally as suspension in water is 100% effective against mature as well as immature Neoascaris vitulorum in calves. It should always be followed by a saline purgative to remove the narcotised worms or they will return to normal activity. The dose may be repeated if necessary because of the relative freedom from side effects. It can be administered to pregnant animals as well those suffering from gastro-enteritis.

Turpentine Oil :—in doses of 8.0-15.Oml per calf administered in 60.0-120.0 ml of castor oil on two successive mornings followed by a saline purgative is an old remedy and gives fairly good results.

Bursate (Srongyloid) worms and their Remediesa

The bursate worms infest small as well as large intestine of cattle. The important groups include : (a) Bunostome (hookworm), (b) Trichostrongyles (most of the stomach worms), (c) Oesophagostome (nodular worm) and (d) Metastrongyle (lungworm).

(a) The common 'hookworm' found in cattle is Bunostomum phlebotomum and infests the small intestine (duodenum).

(b) Trichostrongyles—are small-sized, slender, thread-like worms found most commonly in the stomach (called 'stomach worms') and some of them also in the small intestine, causing 'parasitic gastro-enteritis'. The important worms are :—

(i) Haemonchus contortus (wireworm, now called H. placei) (ii) Mecistocirrus digitatus, (iii) Ostertagia ostertagi (brown stomach-worm), and (iv) Marshallagia marshalli are found in the abomasum; (v) Cooperia punctata, C. pectinata & C. onchophora, (vi) Nematodirus filicollis in small intestine; (vii) Trichostrongylus axei and T. colubriformis are found in the abomasum as well as small intestine.

The disease is marked by the same symptoms as described in ascariasis. The blood-sucking worms belonging to the genera of Bunostomum and Haemonchus cause pronounced anaemia and development of oedema of throat (bottle-jaw) and on dependent parts of the body in advanced cases, especially in calves, and eventually death from cachexia.

Phenothiazine :—at the rate of 30.0-60. OG (10. 0 G per 100 lb body weight, maximum 70.O G) for adult cattle, 15.0—30.OG for calves, administered as a drench of 'dispersible powder' in water. It needs neither fasting of the animal before administration nor

post-purgative. It is somewhat costly but very effective 'wide spectrum' anthelmintic which is 100% effective and superior to copper sulphate against Haemonchus spp, 80-100% against Trichostr Ongylus axei and Ostertagia ostertagi present in the stomach; 50% against Cooperia and other Trichostrongyles infesting the small intestine, 50-75% against bunostomes (hookworms). Normally mature parasites only are destroyed. It should, therefore, be repeated after 4 weeks to destroy the parasites that were immature at the time of previous dosing. Nematodirus spp have proved refractory. For prophylaxis continuous use of 0.5 G per 100 lb body weight daily inhibits (i) egg-laying of oesophagostome and haemonchus spp, (ii) hatching of eggs already laid in Bunostomum phlebotomum, and (iii) of the infective larvae which are taken in rarely few reach maturity. 'Strategic (tactic, routine or prophylactic) drenching' is, therefore, better to 'curative or emergency drenching'.

About 50% of any dose remains unabsorbed within the intestine and is responsible for anthelmintic effect. The rest is oxisized in the intestine to phenothiazone and phenothiazine sulphoxide (a photodyanimic agent responsible for photosensitization with corneal ulceration in calves). The latter is absorbed into portal veins and in the liver is further oxidized to leucophenothiazine and leucothianol. These colourless compounds are mostly eliminated through urine and bile and some through faeces and milk, which if oridized to phenothiazone and thianol due to exposure to the atmosphere, give a red colour about 30 minutes after dosing to urine, faeces and milk (which is harmless and may be mixed with the rest, but on aesthetic considerations is not accepted as human food and can be fed to the animals) lasting about 4 days after dosing. The owner of the treated animal should, therefore, be warned of this characteristic colour if using the drug for the first time. The white hair may also be stained more or less permanently, hence do not spill the drug during administration. It should be avoided in weak and emaciated animals, especially calves, in advanced pregnancy and lactating cows. Test first on one or two members of the group to be treated.

Copper Sulphate :—is administered as 1% solution in water at the rate of 30.0 ml per 50 lb body weight, maximum being 300.0 ml for adult cattle and 100.0 ml for the calves. It causes reflex closure of the oesophageal groove and passes directly to the abomasm. Copper being corrosive to metals, make the solution in an enamelled bucket and administer as a drench preferably in the empty stomach in the morning through a glass, brass or copper drencing bottle. No purgative is required. Withhold food for about 2 hours after dosing.

It is cheap and moderately effective against mature H. contortus in the abomasum because it is lethal to parasites only in acid medium, the copper ions soon react with protein of the parasites and food and are not available to react with the protein of parasites lower down in the tract. It, therefore, has little action on other species present in the small intestine. Addition of 40% Nicotine Sulphate in equal parts (cunic) increases its effectiveness against tapeworms and trichostrongyles in the small intestine as well as immature worms, but is somewhat toxic to cattle, when given in the same dose as copper sulphate.

Oesophagostome or Nodular worm :—is Oesophagostomum radiatum and infests the large intestine causing 'nodular worm disease' or 'pimpiy gut'. (b) Chabertia ovina is another

important bursate worm and (c) Trichuris ovis (whipworm) infesting the large intestine.

1. Piperazine Adipate :—in the doses given before, is 100% effective.

2. Phenothiazine :—(q.v.) is 75—100% effective.

(d) Metastrongyle (Lungworm)—is Dictyocaulus viviparus occuring in the respiratory tract of cattle, mostly calves, causing 'verminous bronchitis' or parasitic pneumonia also known as 'husk' or 'hoose', characterized by nasal discharge, paroxysms of cougn with expulsion of mucus which is sometimes mixed with blood and always contains worms and their eggs. The animal gradually loses condition, becomes anaemic and respirations accelerated.

1. Turpentine oil 2. Oml, Liquid phenol 1.0 ml and chloroform 2. Oml.

2. Turpentine oil 2. Oml, Creosote 1. Oml, Chloroform 1. Oml, Olive oil 4. Oml.

3. Creosote 1 part, Glycerine 10 parts. Administer 4.Oml of any of these preparations to calves intratracheally slowly and during inhalation once daily for three consecutive days.

4. Iodine 1.0 G, Potessium lodide 2.0 G, Distilled water 15Oml, administer 1.Oml per kg body weight.

On account of peculiar position of the worms in the trachea, bronchi and lungs, all these treatments are of debatable value.

5. Cyan-acethydrazide (syn. Dictycide, I.C.I.). has been used with a promising success in lambs is the doses of 1.0-2.5 ml given orally or subcutaneously, two injections at 3—4 weeks interval. It acts only on the adult worms present in the bronchial tree. The second dose acts on the worms which have not arrived at this location during the initial treatment. The helminths are not killed in the lungs, but they move up to the pharynx to be swallowed and digested. Such a mode of action makes its use safe even in heavy infestations as the dead worms will not block the respiratory passage.

6. Recently *'Dictal'*, a lungworm (oral) live vaccine prepared by Glassgow veterinarians by x'ray sterilization of lungworm larvae, prevents bovine husk when administered orally in two doses with an interval of six weeks between them.

3. Filaroid Worms and their Remedies

Filaroid worms are mostly tissue parasites and the important ones are :—(i) Parafilaria bovicola-causing formation of nodules in the subcutaneous tissue which often bleed profusely, working bullocks commonly affected, cows rarely. It is common in summer, lowering general condition in severe cases, but disappears in winter. (ii) Onchocerca gibsoni, causes nodule formation in the subcutaneous tissue of the brisket and the external surface of hind legs; O. gutturosa in the ligamentum nuchae.

(iii) Setaria cervi (S. Labiato-papillosa):—in the peritoneal cavity, and S. digitata also occuring in the peritoneal cavity of zebu in India, Ceylon and Burma, and eyes of eguines in Indo-China, the latter has been incriminated recently as the cause of 'cerebro-spinal nematodiasis' in goats or 'kumri' in horses in India due to immature worms characterised by acute encephalo-myelomalacia with paralysis of all four limbs or hind limbs only.

(iv) Stephanofilaria assamensis :—causes 'Dum-Dum sore' or 'Hump sore' in cattle in Assam, Bengal and Orissa. During winter the lesion dries up and remains quiescent till the next rainy season when it again assumes activity.

Tartar Emetic (*Potassium Antimony Tartrate*). *or Sodium Antimony Tartrate*—is used to kill the circulating microfilariae in :—(a) Heamorrhagic filariasis at the rate of 100.0 ml of 1% solution or 50.0 ml of 2% solution I/V. Repeat the injection once or twice at weekly intervals.

(b) Dum-Dum sore-after surgical removal of the diseased tissue, dress with 4% tartar emetic ointment for a period of 10-15 days and protect the sore from flies, etc throughout the period of treatment. If necessary inject sodim antimony tartrate 1.0 grain per 100 lb body weight as 2% solution I/V. twice a week.

(c) Setariasis.

NOTE—The '*diagnosis*' of diseases caused by (1) the worms in the alimentary canal is confirmed by detection of their eggs in the faeces under the microscope, (ii) the adult parasites in the infested portion of the digestive canal on post-mortem examination.

2. In case of verminous bronchitis by examining the parasite and the eggs, under microscope, in the coughed-up mucus or nasal discharge.

3. In case of hump sore by examining the scrappings from the lesion under the microscope for the detection of microfilaria. Adult worms may also be found in the lesions.

● TREMATODES

THE class Trematoda deals with flat and non-segmented 'fluke worms' with a complex life-history involving snails as intermediate hosts. They are mostly tissue parasites and include (i) liver flukes, (ii) stomach flukes, (iii) blood flukes and (iv) lung fluke.

Liver Flukes

Infest the bile-ducts and liver parenchyma of cattle causing a poor and slow development of affected animal, damaged liver, anaemic and emaciated condition. The important pathogenic worms are:—(i) Fasciola gigantica, occuring in wet areas throughout India; and F. hepatica, in the hills. These are 'large flat' flukes. (ii) Dicrocoelium dendriticum, found particularly in the hills and (iii) Eurytrema pancreaticum-in the pancreatic duct, both being 'small flat' flukes.

Hevachloroetyane (I.C.I.) is white crystalline powder with camphoraneous odour, tasteless, insoluble in water, but now available in the form of 'dispersible' powder with 5% dispersing agent which forms a fairly stable suspension in water. Dosage—cattle 15.0—45.0G, calves 8.0—15.0G. Administer the dispersible powder as haust in water. Give soluble calcium salts for a week before treatment to animals showing calcium deficiency.

It is slowly absorbed from the the intestine and the majority is excreted by the liver in the bile killing 'mature' flukes located in the bile-ducts, but has no action against 'immature' flukes still burrowing in the liver parenchyma previous to locating in the bile-ducts. It should be administered as early as possible in the outbreak because it is somewhat less effective when the bile-ducts are extensively damaged by the existing disease. Where much liver damage has been inflicted by heavy infestation, better administer the drug in divided doses on 3 or 4 consecutive days. The disease can be prevented by four doses yearly (a) before the onset of the monsoon, (b) at mid monsoon, (c) at the end of the monsoon, and (d) one month later.

As anti-trematodal, a single dose is 92%

effective in cattle. Repeat after one month for complete removal. It is equally efficaceous and less toxic than carbon tetrachloride, especially in cattle.

It is also effective against Dicreocoelium dendriticum and stomach flukes in cattle.

Carbon Tettachlorids : in the doses of 4.0—8.0ml in adult cattle and 1.0—2.0ml in calves is an old drug but is dangerous and toxic to cattle grazing on poor pastures or on plants containing oxalates, in late pregnancy and early lactation in cows with low calcium level in the blood and animals whose liver is greatly damaged by liver flukes. It is adminstered by stomach tube as an emulsion, 4 times its volume, in mucilage, gruel, liquid paraffin, skim milk, a solution of sodium or magnesium sulphate. Oils help its absorption into the system and consequently toxicity. Diet rich in carbohydrates renders it less toxic.

Liquid Extract of Male Fern : is another old drug available in the form of an oily extract with either and contains 25% filicin. It is given in the doses of 15.0—45.0ml to adult cattle and 4.0—8.0ml to calves, administered in a litre of linseed or castor oil in combination with 60.0ml of terpentine oil to adults. Slight absorption of the drug with the help of these oils kills the parasites which then disintegrate and are expelled from the bile-ducts. It is safer than carbon tetrachloride but comparatively expensive and less effective than that drug.

Stomach Flukes (Amphistomes or Paramphistomes)

These are thick fleshy 'conical' flukes. The important ones ar: (i) Paramphistomum cervi and P. explanatum (ii) Cotylophoron cotylophorum, and (iii) Gastrothylax crumenifer.

The 'non—pathogenic' adult worms are found in the rumen and reticulum, whereas the 'pathogenic' immature worms occur in the abomasum and the duodenum causing 'acute gastro-enteritis'.

1. *Hexachloroethane* (q.v.)

2. *Tetrachloroethylene*—is a heavy colourless liquid, less volatile than carbon Tetrachloride, odour ethereal. The dose for adult cattle is 15.0—30.0ml and for calves 2.5—7.5 ml, administered in soft gelatine capsule in calves and by stomach tube as an emulsion with liquid paraffin in large animals. With hold all food and water for 2-3 hours after dosing. It is better than carbon tetrachloride for removing adult flukes from the rumen. Administration of 60.0ml of 10% soda bicarbonate solution 5 seconds before administering the drug brings about reflex closure of the oesophageal groove and permits direct passage of the drug to the abomasum and its action on immature flukes.

Blood Flukes (Scistosomes)

Infest the blood-vascular system. The important worms are: (i) Schistosoma nasalis- occurring in the nasal veins and causing 'nasal schistosomiasis' or 'nasal granuloma' or 'snoring disease'. The cauliflower-like outgrowth in the nasal chambers interferes with respiration resulting in snoring and reducing the working capacity of the bullocks.

S. spindalis, S. bovis, S. japanicum and S. indicum occur in the mesenteric and portal veins causing 'Intestinal schistosomiasis' characterised by constipation alternating with diarrhoea, anaemia, gradual wasting and death in heavy infestations.

(ii) Ornithobilharzia turkestanicum, occurs in the mesenteric veins in cattle.

1. Sodium Antimony Tartrate—Being readily soluble in water (1:1.5) is preferred over Tartar Emotic (Potassium Antimony Tartrate) which is soluble 1:17 of water and is cardiac depressant. It is given at the rate of gr per 100 lb body weight in 2% solution at 4-days intervals 4 to 6 times intravenously. This prolonged course of treatment makes the owner to stop away in the middle of the course as soon as he finds some abatement in the clinical symptoms. To overcome this difficulty V.S. Alwar has recently (1959) found effective the same rate of dosage to be injected three times a day (9.00 a.m., 12.00 noon, & 5.00 p.m.) on two consecutive days. It has now proved a cheap and effective drug for the treatment of N.G. in cattle.

2. *Antimosan (Bayer)* is marketed in 50.0ml or 500.0ml bottles. The dose for cattle is 20.0--40.0ml, administered subcutaneously or intramuscularly. A complete course consists of 3 such injections at the interval of 4-days. It is costlier than tartar emetic, but not so effective in N.G.

3. Anthiomaline (M. & B.) is marketed as 6% solution of Lithium Antimony Thiomalate. The rate of dose is 20.0ml per adult cattle, administered subcutaneouly of intramuscularly and repeated once or twice weekly. It is less toxic than tartar emetic in nasal granuloma, but is less effective in comparison to that drug.

Lung Fluke

Is Paragonimus westermanii occuring in the lungs of cattle.

According to Rao intramuscular injections of *prontosil Soluble and Emetine Hydrochloride* are effective. Tartar emetic of *Sodium Antimony Tartrate* may also be tried.

● CESTODES

THE class Cestoda includes flat and segmented 'tapeworms', the adults of which are mostly found in the small intestine of cattle, especially the calves and the 'immature cystic or larval forms' live in either warm or cold-blooded intermediate hosts. The common cestodes found in ruminants are:

(i) Moniezia expensa, M. benedeni and M. denticulata—are 'broad' tapeworms.
(ii) Avitellina centripunctata—is 'narrow' tapeworm.
(iii) Thysanosoma actinoides—occurs in the bile and pancreatic ducts also and is known as 'fringed' tapeworm.
(iv) Thysanesia giardi
(v) Stilesia hepatica—found in bile-ducts also.

The important larval stages (bladder worms) are:

(i) Hydatid (Echinococcus) cyst-present in the liver, spleen and lungs of cattle which act as intermediary host, for which the adult worm is Echinococcus granulosus with dog as normal host.
(ii) Cysticercus bovis—is the larval form of Taenia saginata of man, found in the voluntary muscles of cattle causing 'beef measles' or 'measly beef'.
(iii) Cysticercus tenuicollis—is the immature form of Taenia hydatigena of canines, found in the peritoneal cavity and the liver of cattle.

1. Bead Arsenate is white powder, insoluble in water. Dosage—adult cattle 1.0—2.0 G, calves 0.5—1.0 G. Administer orally in gelatlne capsule, followed by a dose of castor oil after one hour. No fasting either before or after administration is required.

(Contd. on Cover III)

Seminar held at Lucknow on ARTIFICIAL INSEMINATION

by:
Shri H.K. LALL

THE various aspects of artificial insemination in cattle were discussed at a seminar of the Veterinary Officers held at Lucknow from 17th to 19th September, 1962. Hardly a decade ago, this subject was considered as an exclusive preserve of a few scientists, be they veterinarians, geneticists or physiologists, but now it forms a common topic of discussion even in our villages. It is not very unusual to get a request from the villagers saying in their simple straight forward way that an artificial insemination centre should be established in their area. To meet the growing requirements of the people, a vast programme of artificial insemination is being taken up in the U.P. and it became necessary more than ever before, that the Veterinary Officers, who have been shouldering this responsibility, should be posted with the latest information about the researches carried out on the various aspects of artificial insemination so as to be able to carry out their work more effectively and be able to provide food for thought and further investigation by placing their difficulties and problems before the research workers. The seminar was, therefore, attended by the Veterinary Officers from the various centres of the State, experts from the U.P. Veterinary College, Mathura and a few private breeders, who never miss to highlight the practical aspects of the problem from their point of view.

The subjects discussed covered an extensive field right from the dilution and preservation of semen to the selection of bulls. After detailed discussions, it however, became apparent that the artificial insemination, though a very useful technique in the hands of veterinarians for improvement of livestock in the country, was pregnant with dangers unless precautions were taken at every step to follow the technique properly. This discussion helped to remove the impression in the minds of many that artificial insemination was a very simple technique and it just meant collection of semen and injecting the same into the genital organs of the cow or buffalo. The pitfalls, which may occur in the execution of artificial insemination programme, are many to many, and all these were highlighted at this seminar of the Veterinary Officers, to enable them to carry out this responsible task in a better way. The discussions also revealed very clearly that the work of the Veterinary Officer, as far as artificial insemination was concerned, was of much greater responsibility than routine veterinary treatment and comparatively needed much more preparation, not only at the level of the

Veterinary Officer, but at the laboratory for further probe into the problem and at livestock farms for providing good quality bulls.

As regards the management of bulls, it was emphasised, that to maintain their fertility, they should be provided with green feeds throughout the year and that the livestock farms in the State should play a more effective and wider role in future for regular supply of green fodder to the A.I. Centres located near them and in producing fodder seeds for distribution to the cultivators for growing more and more fodder. It was advised, that in those areas where green fodder was not available from the farm, the local cultivators should be induced to grow sufficient fodder not only for their own cattle, but also for the bulls being maintained for A.I. service in those areas. It was very necessary to protect these bulls from the climatic strains and stresses by providing suitable shelter. Sheds with cemented floor and tinned roof could not be considered the ideal shelters by any stretch of imagination as they became extremely hot in summer and cold in winter. It had been proved, as the result of experiments carried out in different countries, as well as in the U.P. Veterinary College, Mathura, that exposure to high temperatures during summer seriously affected the spermatogenesis in bulls. Handling of these bulls was not to be considered as a routine job, but needed proper training of the cattle attendants. The slightest mishandling of bulls would seriously affect the quantity and quality of semen, which, it would not be possible either to dilute to the desired extent or to preserve for the required duration.

Experiments were suggested on milk as a diluent in some of the selected centres and it was postulated, that milk which had been found useful as a diluent in some other countries, if proved successful here, would provide us with a much cheaper diluent than the ones being used at present. Issue of standardised buffer from a central place was considered to be very economical and besides it was felt that such a procedure would also ensure supply of a standard quality buffer to all the A.I. Centres. To prevent wastage and to prolong the viability of the semen, it was decided that semen should be preserved in smaller ampoules which after using once could be discarded straight away. Use of large ampoules led to poor viability on account of the need for handling them more than once and thus greater wastage.

Great emphasis was laid on the number of collections to be made in a year. It was felt that number of collections could be considerably reduced in Murrah bulls, during certain seasons, on account of the seasonal breeding in buffaloes.

It was considered important, that due importance should be given to the various economic factors while selecting bulls for artificial insemination work. The main economic factors to be looked for in their dams were to be the weight at birth, which determines to a great extent the growth rate of the animal and it was probably interlinked with the future production of the animal, early maturity. i.e. the age at first calving, milk yield in a lactation period and the breeding efficiency which would imply regular calving period, a brief dry period and *insofacto* an intercalving period of a reasonable duration. Every effort should be made to provide optimum conditions of feeding and management to such selected calves, so that they mature early and can be used for breeding as early as possible. It was stressed that progeny testing should be carried out on large scale and that this, perhaps, would be the only

useful method of selection of calves, where variation in milk yield amongst the dams were narrow and that such variations were bound to be narrow in due course, when the improvement in the yield as a result of better management had been brought about at the farms. An emphasis on these characters will also have to be laid, when purchasing bull calves for breeding purposes from the breeding tracts. Adoption of such a procedure would automatically imply purchase of calves from such owners, who were in a position to maintain records of their animals' performances.

The policy of issuing bulls from the farms to the A.I. Centres and from the breeding tracts to the non-breeding areas was reiterated. The obvious need of using the best bulls at the farms and the second best at the A.I. Centres and others in non-breeding areas was pinpointed. It was also suggested, that the bulls having more than average fertility should be used more extensively and that their use should not be restricted only to the farms or the A.I. Centres where they were located. Example of premium bulls and nominated bulls in U.K., whose semen could be made available in any part of England on payment of slightly higher price was cited in this connection.

It was felt, that the Milk Recorders provided under the Key Village Scheme would only be able to maintain records of a limited number of cows and that if the cattle breeders in general were to be persuaded to maintain the milk records of their cows as is the practice in other countries, then some suitable incentive will have to be provided to them in the beginning and which, for example, could be in the form of bonus for bull calves in the Key Village areas, which were eventually purchased by the Department for using them as breedi ng bulls or by giving better prizes to cows of such owners on the occasion of One Day Cattle Show, etc.

It was suggested, that rigorous selection standards should be applied when selecting calves for subsidy and such economic characters as were considered for selection of bulls should also be kept in view when selecting these calves. The owners should be persuaded to adopt standard methods of feeding and management so as to obtain early maturity in their calves, thereby making it possible for the department to purchase them early for use as stud animals. For instance, if bull calves could be purchased at age of 18 months, instead of two years, then the targets could be increased and the subsidy saved for a period of six months could be used for subsidising extra calves.

As a result of the experience gained at the various A.I. Centres, it was divulged that sterility and infertility or sub-fertility was a major problem in the field, though of course the high percentage of infertile animals brought to the A.I. Centres did not necessarily reflect the general incidence of sterility and infertility in the field, because quite often the farmer brought only sterile or infertile animals to the centre after having failed in his efforts to get his animal conceived through natural service. All the same it was of paramount importance, that the Veterinary Officers should be able to correctly diagnose the causes of sterility or infertility and apply suitable remedies. It was opined by some that 50% of the cases of sterility or infertility were due to poor nutrition, which may include malnutrition as well as deficiency of essential minerals or trace elements. It was, therefore, considered necessary, that on each of the centres causes of sterility

should be analysed in detail so that relative importance of different factors responsible for causing sterility or infertility were known. In establishing soils or pasture deficiencies as the causes of sterility or infertility, full use should be made of the agricultural soil testing laboratories in the different areas of the State.

For successful execution of artificial insemination work, it was obligatory that Veterinary Officers should be thoroughly familiar with the art of diagnosis of sterility, infertility, pregnancy, etc. To achieve this objective, there was need for intensive inservice training from time to time and that accent in this training should be on practical aspects of the problem rather than the theoretical training or lecturing on fundamental subjects, which most of the Veterinary Officers had studied in their college curriculum. For such a training more use should be made of the facilities and raw material available at the Livestock Farms, Gosadans, Slaughter Houses and popular A.I. Centres. These facilities should not only be utilised for inservice trainees, but also by the regular students of the U.P. Veterinary College, who could usefully spend their vacations in visiting these institutions and while they were there, they should not only record the calving cases or a few other important cases as they do at present, but also maintain a record of the examinations carried out by them on the genital organs of the cows and buffaloes, particularly of such animals, which they have been able to examine in life and than have the chance of confirming their diagnosis on their death. It was mentioned that a similar use of animals to be slaughtered was being made in England, where students during the course of their examination were supposed to inject the Indian ink in a particular spot of the genital tract of the animal, and they were considered proficient only if they were correct in 80% of the cases.

Attention was also drawn towards the common anatomical deviation in the position of the testicles of Murrah bulls which were sometimes located obliquely as in dogs rather than horizontally as in bovines and the possible effect it may have on the sex libido or other inter-related se characters of the bull. It was, therefore, decided that more information should be collected on this important deviation.

The method of collection of semen was discussed in detail, but it was felt that use of anoestrus cow in place of Murrah bull being used at present could not be adopted on account of the experience involved and there was need to make further observations on possible ill effects of this method of collection on the bull, but at present there was no scientific data available to suggest that a dummy cow was less or more harmful than a male animal for using it for collection of semen and that both of them were equally unnatural.

The question of organising more milk competitions was also discussed and it was considered, that the provision made in the Key Village Scheme for the purpose in the III Plan schemes was not adequate and that more funds should be provided for holding milk competitions, which would help in diverting the emphasis of the breeders to the production potential of their animals rather than their phenotypical characters, which so far have attracted much more attention during various cattle shows. It was, therefore, suggested that the prize of Rs. 50 per milk competition, which was too small an amount, should be increased to Rs. 100.

While considering the steps for increasing the fodder production, i.e. growing fodder seeds at the Livestock Farms, it was emphasised that these farms should reserve certain areas for growing fodder seeds to meet the increasing requirements of fodder seeds from the public. It was cited as an instance that no parties sure available within the State, who could supply 800 mds. of berseem seed, which considering the size of the State and the area to be put under fodder, was a very small amount. It was revealed that at present there were not many farmers, who were having surplus fodder for ensiling, but by proper and judicious programming, it may be possible to persuade the farmers to grow surplus fodder and the feeling was that he would do so, if he was convinced of the fact that green fodder conld be preserved as green and fed during summer months when not a blade of green grass was available and which would enable him to maintain the yield of his animals during the lean period of the year. Only then would the need arise to encourage such progressive farmers by providing them loans for construction of silo-pits. Inducing of farmers to have silo-pits by giving them subsidy was not considered worthwhile.

Considering the various aspects of the problem, the obvious conclusion was that there was much wider scope for improving the artificial insemination work and that unless it was assured, that artificial insemination technique would be followed meticulously, there was possibility of doing harm than good. There was, however, some apprehension in being more conservative in extending the artificial insemination technique, because the problem of cattle improvement here was very extensive and unless there was a rapid spread of artificial insemination, the cattle improvement work would progress only at snail's space and have an adverse effect on the village economy, which, as it is, was fairly stagnant. A slow rate of cattle improvement would also stand in the way of agriculture improvement, as prosperous agriculture to a very large extent in this country depended on good bullock power. The work, therefore, has to be carried out at a high tempo, not only in the laboratories of our research workers from where the knowledge has to radiate, but also at the level of the extension worker, whose main problem still remains to convince the cultivator of the utility and the benefits of artificial insemination and make it more popular than what it is today.

The Minister for Agriculture, Ch. Charan Singh rightly emphasised in his concluding remarks, that our workers should try to study the problems as they existed in the country and not as they occurred in some of the advanced country of the world. That was likely only if the workers were fully familiar with their environments. It was, therefore, necessary that more and more scientific books should be written on the basis of the researches and work done in the country and that Indian authors should be encouraged. He suggested holding of seminars at regional level as well, as they were useful media for educating the technicians as well as cultivators and cattle breeders. On account of the magnitude of the problem of cattle improvement, he advised laying down of priorities, so that both intellectual as well as financial resources could be concentrated on important items and in this context he expressed his regret that an important scheme like the Progeny Testing Scheme had not been initiated in the State earlier. He felt that all the cattle and agriculture schemes should be such which would eventually help in raising the living standards of villagers and his per capita income, because unless the buying power and buying resources of the peasantry at large were increased, Indian industries will not be able to maintain themselves or the resources of a few well to do people or exports.

role of rural youths in upgrading village CATTLE

CATTLE have an important place in rural economy of India. Bullocks are the main source of motive power for farm operations and milk is the major source of protective food in the dietary of the people. It has, therefore, been rightly observed that the working bullocks and the cows bear the entire structure of Indian Agriculture. Needless to say that any effort made to increase the efficiency of cattle both in regard to work and milk production, would result not only in boosting farm production but also in making the population healthy.

In planning the agricultural development of the country special emphasis has been given to the improvement of cattle. Key-Village Centres have been established all over the country with the objective of quickly saturating the area with well-bred stock. In pursuance of the programme the Indian Agricultural Research Institute, New Delhi also established a Key Village Centre at Nangloi.

It is proposed to briefly mention here the work done at the Nangloi Centre with regard to activities of the youths in promoting the cause of breeding superior bull for upgrading the local stock. Along with breeding attention was also given to introducing green and succulent fodders for improving the cattle nutrition and maintaining soil fertility.

During 1959-61 about one hundred and sixty youths were selected from eight out of the nineteen villages under the Key Village Scheme. The youth selected belonged to two age groups, ranging from 10 to 15 years and 15 to 20 years. They were further categorised on the basis of literacy and social status. Those receiving primary education were put in one group while others having secondary education formed the second batch. Similarly they were divided into two groups depending on the size of holding upto 10 acres and above.

These youths were assigned the responsibility of rearing 30 male and female calves bred by the Key Village Centre. They were given information on feeding and general management of the calves including prevention and treatment of their diseases. The methods used to impart education to the rural youths in various aspects of calf rearing are as follows :

By

Shri S.K. Sharma • Shri A.R. Khan

Group Discussion

Group discussions were initiated with the youths and topics relating to feeding, management and general care of the calves were discussed.

Method Demonstration :

Method demonstrations were arranged on different aspects of calf rearing, for example, grooming, prevention and care of diseases, feeding etc.

Flash Cards :

A set of flash cards were prepared on calf rearing in attractive colours. These cards were used in series depicting the various steps in calf rearing.

Literature :

A pamphlet was prepared in simple Hindi with illustrations giving detailed information on feeding and management of the calves. It also covered the prophylactive measures to be taken in keeping the calves healthy.

The schedule as given in the table at the end for feeding was recommended for calf rearing upto the age of one and a half year.

To give further incentive to the calf rearing programme, a calf rally was organised in 1960-61 at Nangloi—the Headquarters of the Key Village Scheme. Prizes were awarded to the out-standing calves reared by the youths. Of these, one calf reared by the youths was awarded the first prize by the Delhi Administration.

The rural youths evinced great interest in the work and proved to be an excellent lot in rearing calves on improved lines. In addition, they exercised a positive influence on the attitude of their parents towards the improved method of calf rearing.

The main difficulty observed in the proper rearing of the calves was about the supply of green succulence, especially during the winter months. This was overcome by growing berseem on the fields of the cultivators whose sons were associated with the programme. Berseem was grown in the demonstration plots with two main purposes, first to provide green forage for the calves and secondly, to popularise it as an important fodder during the scarcity months of December to May. The responsibility of looking after the demonstration plots was assigned to the youths. The area under each 'demonstration' was one bigha. The average yield obtained in such demonstration plots was about 815.84 quintals per hectare.

The rural youths and the cultivators of the villages where demonstrations with berseem were laid out seemed to have been convinced about its utility as a green fodder. Moreover, these demonstration plots provided an excellent educational value to the youths for learning the improved method of berseem cultivation.

Thus the association of the rural youths in the programme of Key Village Scheme for breeding superior stock was quite helpful. Not only the animals of high quality were reared but also additional income by the parents was received. It gave an opportunity to rural youths to upgrade livestock of the area concerned on sound principles. It further gave them the confidence and experience in rearing the calves.

(Continued on Cover III)

The success achieved at Nangloi Centre can as well be applied at other Key Village Centres in the country. While selecting the rural youths, however the experince gained at Nangloi should be utilised.

(Contd. from page 32)

It was found that youths belonging to higher age, education and economic status groups responded better than others in adopting improved calf rearing practices. It is also necessary that various extension methods be used in training the youths. In order to make the education effective the number of exposures should be increased.

Besides breeding, the feeding of young stock, especially with green succulence like berseem, plays an important part in the upgrading of livestock. In places where berseem cannot be grown other suitable fodders should be substituted.

Daily feeding schedule of calves according to their age

Age of the calf	Weight of the calf	Milk	Skimmed milk	Concentrates.	Salt	Mineral flour	Green fodder	Bhusa
5 days to 80 days.	32 Kgms	2.75 Kgms.	—	—	—	—	—	—
1 to 3 months.	59 ,,	—	3.5 kgms	250 Gms	—	—	2.5 Kgms.	—
3 to 9 months.	122.5 ,,	—	1.75 ,,	500 Gms	31 gms	15 gms.	4.5 Kgms.	1 Kgms.
9 to 18 months.	168 ,,	—	—	1.5 Kgms	31 gms	31 gms	9 gms.	2 kgms.

(*Contd. from page 25*)

It is 100% effective against Moniezia spp, but is ineffective against 'fringed' tapeworms.

2. *Kamala* is a granular brick-red powder, odourless and tasteless.

Dosage—calves 5.0—10.0 G, adult cattle 30.0—45.0 G Administer in milk or 120.0 ml of castor oil to calves and repeat after 4 hours the same day.

Being a purgative itself, it needs neither combination nor following with a purgative.

It is an old drug, being only moderately (50%) effective against tapeworms, lead arsenate is preferred.

3. *'Cunic' or Cu-nicotine* is a mixture of equal parts of copper sulphate and nicotine sulphate (40% solution). It is used as 1% solution (by dissolving 1 lb of copper sulphate in 10 gallons of water and mixing thoroughly with 1 lb of nicotine sulphate). Do not substitute tobacco infusions for nicotine sulphate because they may prove either useless or toxic to cattle due to their variable nicotine content.

In the doses of 30.0—100.0 ml to calves, administered as adrench, is 50% effective against tapeworms and trychostrongyles, the latter being more pathogenic than cestodes.

NOTE:—

Diagnosis may be confirmed by examining the faeces for worm segments or eggs under the microscope. A drug should be considered to have produced the desired effect only when the heads of the parasites are passed out in the faeces and one should look for these after a vermicide drench has been given.

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